

REMARKS

Art Rejections

Claims 1, 8, 9, 19, and 22-25 stand rejected as anticipated by Kelley. Claims 2-7 and 20, 21, and 23 stand rejected as obvious over Kelley in view of Gibson, Bauer, or Gibson, Bauer, and Copeland. Applicants respectfully traverse these rejections and beg for reconsideration in view of the remarks that follow. The rejection of the remaining claims 10-18 and 26-32 is rendered moot by the cancellation of those claims.

The remaining independent claims 1 and 19 have been amended. As amended, these claims recite, *inter alia*, that a digital input signal is converted to analog form by a digital-to-analog converter(DAC), and the signal output from the DAC is transmitted. The analog output signal is an image signal at a frequency greater than the frequency of the digital input signal.

Kelley has been cited as disclosing all limitations of the orginal independent claims. What Kelley teaches, however, is two alternative methods for producing a frequency-shifted signal for transmission. Both of the alternative methods differ in important respects from the invention as now recited in claims 1 and 19.

In the first method disclosed by Kelley, as shown in Kelley, Figure 1, and discussed at column 4, lines 21-35, the digital signal is presented to digital-to-analog converter 26. The analog output signal from DAC 26 is presented as input to up-converter 30. Thus, the final frequency shift is performed on an analog signal by an up-converter, not by a DAC. By contrast, the present invention uses a DAC to perform both the digital-to-analog conversion and the final frequency shift.

In the second method disclosed by Kelley, as shown in Kelley, Figure 3, and discussed at column 5, lines 44-61, the final frequency shift is performed in the digital domain by FIR filter 38. That is, the FIR filter takes a digital input signal, and outputs a frequency-shifted digital signal. Then, DAC 26 conditions the signal from the FIR filter by converting it from digital to analog without any further frequency shift.

Thus, neither of the alternative methods disclosed by Kelley achieves the advantages of the present invention, in which a DAC performs both the digital-to-analog conversion and the final frequency shift. Even though Kelley teaches the use of a DAC to perform the digital-to-analog conversion, Kelley completely fails to recognize the possibility that the DAC can also perform the final frequency shift. Instead, Kelley discloses only methods in which the final frequency shift is performed by an up-converter or a FIR filter. Therefore, Kelley not only fails to disclose the present invention, but also teaches away from the present invention.

Bauer has been cited as teaching the selection, for transmission, of one of a plurality of converted signal images output from a DAC. Bauer has further been cited as teaching that the conversion frequency of the DAC is at least twice the bandwidth of the original signal so that the output will contain shifted replicas of the primary spectrum.

Applicants respectfully submit that Bauer does not, in fact, contain any explicit teaching about what use might be made of a selected signal image. In particular, Bauer does not teach that a signal image be selected for transmission.

Applicants submit that because Bauer contains no explicit teaching as to how to use a selected signal image, Bauer provides no motivation to combine the teachings of Bauer with those of Kelley. As noted, Kelley teaches away from the present invention and thus, in particular, provides no motivation to combine the teachings of Kelley with those of Bauer. Accordingly, Applicants submit that the Examiner has established no motivation to combine Bauer with Kelley.

Moreover, even if there were *arguendo* some motivation to combine Bauer with Kelley, such combination would, among other things, lack the feature of selecting the input frequency to the DAC and the conversion frequency of the DAC in respect to each other such that the analog image falls within a designated communication band.

Accordingly, Applicants submit that:

(1) The invention of independent claims 1 and 19 is not anticipated by Kelley and therefore is patentable over Kelley under the standard of 35 USC 102;

(2) The Examiner has established no motivation to combine Kelley with Bauer, and therefore the invention has not been shown to be *prima facie* obvious over Kelley and Bauer under the standard of 35 USC 103; and

(3) Even if it were obvious to combine Kelley with Bauer, the combination would fail to meet every limitation of the claimed invention, and therefore the invention as claimed is patentable over Kelley and Bauer under the standard of 35 USC 103.

Two further secondary reference, namely Gibson and Copeland, have also been cited. However, neither of these further references provides any motivation to combine Kelley with Bauer, or to use a selected analog signal image for transmission, or to select any operating parameters so as to place an output signal image in a designated communication band.

Specifically, **Gibson** provides no more than a general description of types of DACs and ADCs that are commercially available and a general discussion of the operation of such devices and their performance parameters. Gibson does not describe any specific applications of such devices. **Copeland** has been cited as teaching to use separate amplifiers in the respective transmission paths of a transponder having a plurality of transmission paths. Copeland has not been cited as providing any specific teaching regarding applications of DACs for frequency shifting of signals, and in fact contains no such teaching.

Accordingly, it is submitted that for the reasons already argued above, claims 1 and 19, together with all dependent claims now pending in the application, are: (1) patentable over the cited references under the standard of 35 USC 102; and (2) patentable over any combination of the cited references, including Gibson and Copeland, under the standard of 35 USC 103.

Claim Objections

Claims 21, 8, and 9 have been amended as requested by the Examiner.

Claim 3 has been amended in such a way as to make it clear that "said" digital signal is part of the "plurality" of digital signals. Although the claim has not been rewritten in independent form as requested by the Examiner, it is respectfully submitted that the imperfection that was the basis for the Examiner's objection has been removed.

Cancellation of claims 12 and 28 has rendered moot the objections to those claims.

Conclusion

Having responded to all points of objection and rejection, Applicants respectfully solicit allowance of all claims now pending in the application.

Respectfully,



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908-582-2908

Date: July 8, 2004

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